

PORTABLE PERSONAL COMPUTER SYSTEM

FIELD OF THE INVENTION

The present invention relates to a personal computer system having capabilities such as computing, printing, scanning, copying, laptop docking, audio/video, etc. More particularly, the present invention relates to a compact, self-contained portable personal computer system configured and arranged in a single unit capable of computing, printing, scanning, copying, laptop docking, audio/video, etc.

BACKGROUND

Traditionally, computer users must choose between alternative computing systems for their computing needs. The user's choice of systems largely depends on the desired application. Workstations associated with a centralized server system, main frame or super computer still exists. The home or student user often purchases a traditional desktop personal computer to be kept in a den, home office, computer room or dorm room. The traditional desktop computer system contains multiple primary components such as a central processing unit, memory (e.g. Random-Access Memory, Read-Only Memory, Cache), a motherboard, a hard drive, an operating system, and sound and graphics cards. Other user-interface devices, such as the monitor, mouse and keyboard, allow a user to interact with the primary devices and are connected by separate wires of varying lengths and sizes through conventional interfaces to these primary devices. In addition to these components, a desktop computer is often connected to or networked with various peripheral devices such as a video cam, a voice system, a document scanner and printer, each of which are also hard wired by separate wires of varying lengths and sizes through conventional interfaces to the primary devices. This combination of components is highly functional and allows the user a wide range of capabilities.

The traditional desktop computer possesses numerous advantages, including but not limited to, its ability to process vast amounts of data without error, to enable its user to produce documents efficiently, and to allow the user maximum editorial control over the production of those documents. The desktop computer can automate certain ordinary tasks from turning on outside lights in the evening to brewing coffee in the morning. As a multimedia tool, the desktop computer also gives its user the ability to produce information in a graphical audio and video format, allowing studio-like presentations. Certain disadvantages, however, are inherent in the desktop computer's configuration.

Due to its bulk and weight, a desktop computer system and its multiple peripheral devices are difficult to transport. Consequently, moving the system is often only feasible when permanently relocating the system to another area and it must be disassembled and reassembled to accomplish the move. Each of the multiple peripheral and user-interface components also requires its own power supply, increasing the number of power cords, external AC adaptors, and multi-pronged electrical plugs needed for operation. The multiple peripheral components and power supplies also require a large amount of desk space for operation, and increase the complexity of and the time required for the desktop's set-up and configuration procedure. These limitations lessen the feasibility of utilizing such a system in small businesses, college dormitories, and homes.

The present invention also utilizes and improves upon certain features of the laptop computer system. Unlike the typical home or dorm room user, a business traveler often purchases a laptop computer. A laptop computer is a portable personal computer that avoids many of the desktop computer's disadvantages. Because of its size, a laptop computer is easy to transport. Its internal configuration of components such as the keyboard, cursor control sensor, and monitor allows for minimal set-up and configuration time and requires less desk space for operation. At typically less than 10 lbs., a laptop

computer also weighs less than a desktop computer. However, a laptop computer lacks the functionality and comfort of a traditional desktop computer.

A laptop computer's screen usually presents substantially less viewing area than a desktop computer's monitor. Similarly, a laptop computer's keyboard is usually smaller than a standard keyboard, and a laptop computer's trackball or touch pad may be more difficult to use than a standard mouse. A laptop computer generally has less storage space on its internal disk drive than a traditional desktop. Also, a laptop computer often allows its user to access only one type of disk drive at a time. To compensate for this lack of functionality and comfort, a laptop computer can support added peripheral devices such as a full sized keyboard and mouse, one or more speakers, and a variety of external storage devices, all hard wired to interfaces and/or to each other. The addition of these devices however creates transportation and weight limitations similar to those of a desktop computer.

Accordingly, improvements on the existing personal computers are desired. For example, it would be advantageous to provide a combination of primary computer devices and peripheral computer devices within a single system enclosure, wherein the enclosure is easily transported and requires minimal desk space and set-up time for operation.

SUMMARY

To resolve the above and other problems and disadvantages of the existing personal computer systems, the present invention provides a combination of the functionality and capability of a desktop computer and its various peripheral devices, including a document scanner and printer, with the convenience and portability of a laptop computer thereby reducing the system's weight and the desk space required for operation, and simplifying the system's set-up procedures.

In one embodiment of the present invention, multiple primary and peripheral devices, including a central processing unit, at least one memory device, a motherboard, a hard drive, sound and graphics cards, a video cam, a microphone, one or more speakers, a document scanning device and a printing unit, etc., are configured and arranged in a single system enclosure equipped with a handle and at least one transport wheel.

A traditional system equipped with various external devices often requires a complicated set-up procedure. Typically, a traditional system will come packaged with various instructions and hints for performing the often time-consuming procedure. One advantage of the present invention is that it allows a consumer to purchase a pre-configured system, requiring no time-consuming and complicated set-up procedures. In one embodiment of the present invention, an operating system may be pre-installed, and the requisite software and drivers required for operating the included devices may be embedded as well. Also, the present invention minimizes the number of documents normally included in the purchase of a personal computer that describe the system's set-up procedures and operation.

Typically, the need to connect various peripheral and user-interface devices to a personal computer clutters the desk and floor space around such a system. A printer, a scanner, one or more speakers, a video cam, and a monitor, all connected to a standard personal computer, would each need a cable connecting the particular device to the personal computer and a power cord connecting the particular device to a power source. In most instances, this configuration leads to a tangle of wires connected to a power strip, causing an unsightly and unsafe working area that impedes a user's ability to quickly identify the location of a particular device's interface with the computer and may result in damage to the connecting cords and cables. One advantage of the present invention is that it eliminates these concerns by combining the separate power supplies for each of the

various devices into a single power supply serving all functions of the present invention. In one embodiment of the present invention, a single electrical prong disposed outside of a system enclosure and a single power cord connected to the electrical prong are the only pieces of the system's power supply visible to a user. A user can power the entire system by simply plugging the power cord into a power outlet and turning the power on the system enclosure.

Another advantage of the present invention is that it eliminates the bulky monitor traditionally associated with a desktop computer system and includes a flat screen display that is connected to the system's power supply. In one embodiment of the present invention, a flat screen display is hinged to a system enclosure so that in a closed position the flat screen display folds into the system enclosure, and in an open position the flat screen display remains upright at a height sufficient to minimize the strain on a user's neck.

In further minimizing the number of external devices and corresponding connection cords or cables, one embodiment of the present invention includes an infrared mouse and an infrared keyboard. An infrared sensor within the computer system provides an optical interface between the system and the mouse and between the system and the keyboard. The infrared keyboard can be stored completely within the system enclosure in a keyboard storage tray. By storing the infrared keyboard within the keyboard storage tray when not in use, the user can completely remove the infrared keyboard from view thereby further reducing the clutter surrounding the system and maintaining an aesthetically pleasing work area. Further in one embodiment, a docking station is built in the keyboard storage tray for docking with another computer system.

Because of its various components contained in a single system enclosure, the present invention provides an easy-to-use, multi-functional system within a portable

housing. Further, the overall weight of the system is considerably reduced. These features and other aspects and advantages of the present invention will become clear after examining the following description, appended claims, and accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

The novel features of the present invention are set forth in the appended claims. The invention itself will be best understood by reference to the following detailed description when considered in conjunction with the accompanying drawings, wherein:

Figure 1 is a front perspective view of one embodiment of a portable personal computer system, in accordance with the principles of the present invention, having a flat screen display raised to an open position, a video cam integral to the flat screen display, and a front panel opened to illustrate an infrared keyboard and an infrared mouse stored in a tray, and a docking station built in the tray.

Figure 2 is a bottom perspective view of one embodiment of a portable personal computer system, in accordance with the principles of the present invention, showing an extended handle capable of pulling the computer system and a top handle for carrying/lifting the computer system.

Figure 3 is a rear perspective view of one embodiment of a portable personal computer system, in accordance with the principles of the present invention, showing a side panel in an open position to illustrate media ports, and showing cooling facilities and interconnects on the back of the computer system.

Figure 4 is a perspective view of one embodiment of a portable personal computer, in accordance with the principles of the present invention, being transported by a pulling handle extended out of a system enclosure.

Figure 5 is a perspective view of one embodiment of a portable personal computer system, in accordance with the principles of the present invention, housed in a carrying case with a pulling handle extended out of the carrying case.

Figure 6 is a perspective view of one embodiment of a portable personal computer system, in accordance with the principles of the present invention, showing bottom of the carrying case with wheels for transport and stops for stand.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

The present invention relates to a personal computer system having capabilities such as computing, printing, scanning, copying, laptop docking, audio/video, etc. More particularly, the present invention relates to a compact, self-contained portable personal computer system configured and arranged in a single unit capable of computing, printing, scanning, copying, laptop docking, audio/video, etc.

The present invention allows business travelers, students, and/or home users to utilize various components of a traditional desktop computer system without being limited by the time required to set-up and/or configure a desktop system, the space needed to operate a desktop system, and the inability to transport a desktop system. Any reference in this detailed description to front and back, right and left, top and bottom and upper and lower is intended for convenience of description, not to limit the present invention or its components to any one position or special orientation.

Referring now to the drawings and particularly to **FIGS. 1 and 2**, one embodiment of a portable personal computer system **20**, in accordance with the principles of the present invention, is illustrated. The portable personal computer system **20** includes a system enclosure **22** preferably made of metal and/or plastic and formed in a rectangular

shape having a top, a bottom, and four sides. The system enclosure **22** accommodates the features of the present invention and maintains a flat screen display **24** at a sufficient height to minimize strain on a user's neck while operating the portable personal computer system **20**.

The system enclosure **22** includes a front cover **26** rotatably hinged at one end of the system enclosure **22**. The front cover **26** may include a standard fastening mechanism (not shown) so that in its closed position, the front cover **26** remains closed until the fastening mechanism is released. A carrying handle **28** is disposed on the outside of the front cover **26** and capable of supporting the full weight of the portable personal computer system **20**. The carrying handle **28** allows the user to carry the portable personal computer system **20** when the front cover **26** is in the closed position, and lift the system **20** into a carrying case (**FIGS. 5 and 6**) for transportation.

The system enclosure **22** preferably provides a rigid structural frame for housing the system's central processing unit (CPU) that contains multiple memory circuits, such as ROM and RAM, etc. The system enclosure **22** is connected to a power supply (not shown) via a power supply port **30** (**FIG. 3**). The system enclosure **22** further includes air vents **32** and may also include at least one fan **33** (**FIG. 3**) so as to allow air to circulate over the computer components inside the system enclosure **22** to sufficiently cool the personal computer system **20**.

As shown in **FIG. 1**, the front cover **26** is in its open position. A tray **34** is disposed at the bottom of the system enclosure **22** behind the front cover **26** and is pulled out of the system enclosure **22**. An infrared mouse **35** and an infrared keyboard **36** are stored in the tray **34** when they are not in use. In **FIG. 1**, the infrared mouse **35** and the infrared keyboard **36** are removed from the tray **34** for illustration purposes. An infrared

sensor (not shown) for optical communication with the infrared mouse **35** and the infrared keyboard **36** is electrically connected to the computer components, such as the CPU, and mounted therein and proximate the front side of the portable personal computer system **20**. The infrared mouse **35** and the infrared keyboard **36** transmit data to the infrared sensor in the manner known in the art. It is appreciated that the infrared sensor can be installed on a display **38** so that the infrared mouse **35** can be used like a laser pointer known in the art to minimize wrist movement by a user for operating the system, thereby reducing susceptibility to carpal tunnel syndrome. Further, the infrared keyboard **36**, such as an infrared alpha-numeric keyboard, allows a user to efficiently interface with the portable personal computer system **20** without fixed connections. Input from a user is optically transmitted from the infrared keyboard **36** and/or mouse **35** to the infrared sensor, and is transformed to electronic signals to control a variety of computer processes.

In addition that the tray **26** is capable of fully housing the infrared keyboard **36**, the tray **26** can slide outside of the system enclosure **22** when the front cover **26** is in an open position. The tray **26** may also contain a docking port **40** that allows the transfer of data between another computer, such as a laptop computer, and the portable personal computer system **20**, and allows the portable personal computer system **20** to serve as a base computer if another computer is required for remote operations.

Also in **FIG. 1**, connected to the CPU through standard interfaces are the system's data storage devices, including a hard drive (not shown), a floppy disc and/or zip drive **42**, and a CD and/or DVD drive **44**. The hard drive is mounted inside the system enclosure **22** and at the base of the portable personal computer **20** in a compact manner. The floppy disc and/or zip drive **42** and the CD and/or DVD drive **44** are mounted in one or more standard storage bays within the system enclosure **22** in a manner that allows a

user to place appropriate storage medium within the drives through a slot of the system enclosure **22** of the portable personal computer system **20**.

A document scanning unit or module is also connected to the CPU and to the power supply through a standard electrical connection. The document scanning module captures images and text and allows the user to save the information to the memory components of the portable personal computer system **20**. The document scanning module includes a scanning cover **46** that aids the scanning software in determining the size of the object being scanned, a transparent area **48** upon which a user places the document to be scanned, a scan head having components, such as mirrors, lenses, filters, and CCD array, etc., for producing an image of a document to be scanned, a stepper motor and belt combination providing mechanical means by which the scan head traverses the document to be scanned, a stabilizer bar insuring that the scan head traverses smoothly under the document to be scanned, and a lamp to illuminate the document to be scanned.

The scanning cover **46** is hinged to the system enclosure **22** via a standard hinge **50** so that in an open position, the scanning cover **46** can be positioned in a variety of angles including approximately perpendicular to the transparent area **48**, and in a closed position, the scanning cover **46** can rest immediately over the transparent area **48**. The standard hinge **50** is attached to the system enclosure **22** and, in the preferred embodiment, the hinge **50** is located along one side of the transparent area **48**. The transparent area **48** is located in the upper portion of the system enclosure **22** and is visible when the scanning cover **46** is in its open position, allowing a user to place the document to be scanned directly on the transparent area **48** and below the closed scanning

cover **46** with the particular side of the document to be scanned facing the transparent area **48**.

The lamp is located within the system enclosure **22** in a position that enables to illuminate the entire document to be scanned. The scan head is positioned beneath the transparent area **48** and mounted for longitudinal movement across the document to be scanned. The stabilizer bar may be mounted within the system enclosure **22** by mounting brackets positioned near the right and left sides of the system enclosure **22** and in the same direction as the longitudinal movement of the scan head. A stepper motor (not shown) connected to the power supply through an electrical interface may be located within the system enclosure **22** and mounted for minimizing interference with the other components of the portable personal computer system **20**. Upon input from a user directing the scanning operation to begin, the stepper motor drives the belt system that pulls the scan head along the upper side of the stabilizer bar and below the document to be scanned. The scan head may be allowed to move within a limited range of travel by the stepper motor, as determined by the size of the document to be scanned. The portable personal computer system **20** may be installed with the scanning software necessary to transform the images retrieved by the scan head into full color electronic pictures for eventual manipulation and transmission by the user.

A printing unit or module may be included within the system enclosure **22** and is electrically connected to the CPU and to the power supply. The printing unit allows the user to print the images and text captured by the scanning device or to print documents or faxes contained in the computer memory. The printing unit may utilize the stepper motor and belt system mounted within the system enclosure **22**, may be synchronized therewith, or all units may be synchronized with a computer clock. A document feed-in slot **52**

(FIG. 3) and a document exit slot 54 are preferably located horizontally along the sides of and towards the top of the system enclosure 22. A roller assembly, mounted within the system enclosure 22 and driven by the stepper motor and belt system, creates a document feed path directing a sheet of paper from the document feed-in slot 52 to the document exit slot 54. The printing module is mounted near the document feed-in slot 52 and aimed directly at the document feed path in such a way that a printing operation and a scanning operation share similar components but operate independently of one another. The printing module may be any compact commercially available printing module, such as an inkjet, dot-matrix, laser, etc.

Upon input from a user directing a printing operation to begin, the stepper motor drives the belt system that rotates the roller assembly and pulls a sheet of paper from the document feed-in slot 52 and along the document feed path. The printing unit prints the desired pattern, and the roller assembly carries the sheet of paper towards the document exit slot 54 and out of the system enclosure 22. Storage trays may be provided at the document feed-in slot 52 or at the document exit slot 54 to receive the printed documents. Printing software and drivers are pre-installed in the portable personal computer system 20 to allow immediate operation of the printing unit.

The display 38 is preferably a flat screen display. The flat screen display 38 is located within a display frame 56 and hinged to the system enclosure 22 via the standard hinge 50, so that in an open position, the flat screen display 38 can be positioned in a variety of angles including approximately perpendicular to the top of the system enclosure 22, and in a closed position, the flat screen display 38 can be positioned immediately over the closed scanner cover 46. The hinge 50 is configured and arranged to connect both the flat screen display 38 and the scanner cover 46, and allows each to

rotate independently of one another. The flat screen display **38**, a standard liquid crystal display of the type well known in the art or of any new technology in the future, visually displays the output generated by the software applications, such as a video card, and is connected electrically to the system's internal circuitry and to the system's power supply. The connection can be provided between a slot within the display frame **56** side of the hinge **50** and a corresponding slot within the system enclosure **22** side of the hinge **50**. A cable connecting the flat screen display **38** to the internal circuitry can pass through the slots (not shown) to the system's internal circuitry regardless of the display frame's **56** positioning. In the preferred embodiment, the display frame **56** contains a standard fastening mechanism (not shown) that locks the flat screen display **38** and the scanning cover **46** in place while not in use. When needed, the user can unlock the fastening mechanism and rotate the flat screen display **38** and the scanning cover **46** in any desired position.

As part of a complete PC telephony system, one embodiment of the present invention includes a video cam **58**, housed within a camera mounting bracket **60**, for recording the surrounding view. A camera mounting bracket **60** is preferably located in the upper portion of and within the edge of the display frame **56**. The mounting bracket **60** may include an opening suitably sized so that the video cam **58** can be force-fit into and housed within the opening. The video cam **58** may be of any number of standard mini video cams commercially available. The video cam **58** is electrically connected to the power supply and to the appropriate internal components of the portable personal computer system **20** by a cable that is mounted within the display frame **56** and, along with the flat screen display's **38** electrical connections, passes through the slots in the hinge **50** described previously. The video cam **58** may be slightly recessed from the surface of the display frame **56** to avoid contact between the video cam **58** and the system

enclosure **22** when the display frame **56** is in the closed position. In the preferred embodiment, the video cam **58** and the camera mounting bracket **60** are arranged or positioned in such a way that avoids interference with the locking mechanism on the display frame **56**.

Along with the video cam **58**, the portable personal computer system's **20** complete PC telephony system may include a modem, at least one speaker, a microphone, a sound card, a video card, and PC telephony software, each fully enclosed within the system enclosure **22**. The modem, sound card, and video card are mounted within and at the base of the portable personal computer system **20** in a compact manner similar to that of a portable laptop computer. The microphone and speaker(s) are mounted within and along a side of the system enclosure **22**.

Slots **62** are located along the outside of the system enclosure **22** so that the sound-emitting side of the speaker and the sound-receiving side of the microphone are located directly behind the slots **62** to allow a user to clearly hear sound from the speaker(s) and to allow the telephony system to clearly receive and record sound from the user. These components are connected to the power supply and/or the motherboard through conventional interfaces. The PC telephony system allows communications with remote terminals and supports voice communication, voice messaging, faxes, video conferencing, and call, voice and e-mail routing.

Referring to **FIG. 3**, the power supply is connected to the CPU through standard interfaces and contained within a separate compartment located within and at the back side of the system enclosure **22** with standard mounting brackets. The power supply is designed in such a way that the power supply is contained within the system enclosure **22**, and the electrical plug **30** located at the back of the system enclosure **22** can be the only

visibly exposed component of the computer system **20**. The electrical plug **30** is attached via a standard interface to an AC bus. The AC bus supplies power to each AC component of the portable personal computer system **20** through conventional interfaces. The AC bus also supplies power to a transformer which may reduce the AC voltage to an appropriate amount and convert the AC voltage to DC voltage. DC power is then supplied to each of the DC components in the portable personal computer system **20**. The system's use of a simple power cord attached to a power source and to the plug **30** on the back side of the system enclosure **22** minimizes the clutter, confusion, and safety hazards of multiple power sources typically associated with a traditional computer system.

Also in **FIG. 3**, a series of ports **64** are disposed on the side of the system enclosure **22** allowing the portable personal computer system **20** to connect to a variety of external devices, including digital cameras, network cards, modems and information storage devices. The ports **64** are electrically connected directly to the system's motherboard. A port cover **66** is rotatably hinged at one end to the system enclosure **22** and contains a standard fastening mechanism so that in a closed position, the port cover **66** remains closed until the fastening mechanism is released. The port cover **66** protects the ports **64** in its closed position and allows full user access to the ports **64** in its open position. The backside of the system enclosure **22** also contains various I/O ports **68** for connecting the portable personal computer system **20** to devices, such as an external printer, monitor and keyboard. The I/O ports **68** can be connected directly to the system's motherboard.

Referring to **FIG. 4**, the portable personal computer system **20** may include an extendable carrying handle **70**, which maximizes a user's ability to transport the system **20**. During operation of the portable personal computer system **20**, the extendable

carrying handle 70 can be fully contained within a handle storage compartment 72 (FIG. 2) in the bottom side of the system enclosure 22. The end of the extendable carrying handle 70 can be positioned flush with the front cover 26. When transporting the personal portable computer system 20, the extendable carrying handle 70 can be extended for ease in transportation. The extendable carrying handle 70 can extend a distance slightly less than the length of the portable personal computer system 20, and is held at that distance by a stopping mechanism that prevents the extendable carrying handle 70 from sliding out of the handle storage compartment 72.

Referring to FIGS. 5 and 6, the portable personal computer system 20 may include a case 74, such as a static free travel case, capable of housing, in its entirety, the portable personal computer system 20. The case 74 may be customized to fit the unique design of the portable personal computer system 20, and to allow the full extension of the extendable carrying handle 70. In the preferred embodiment, the case 74 includes an opening 76 positioned immediately over the extended carrying handle 70 so that a user can carry the portable personal computer system 20 by the extendable handle 70 when the system is completely enclosed by the case 70. On its bottom side, the case 70 may include one or more wheels 78 and one or more stops 80, allowing a user to comfortably carry the portable personal computer system 20 like a portable suitcase by dragging the system across and slightly above the ground. The wheels 78 and stops 80 are arranged in a particular design to maintain the portable personal computer system 20 in a stable vertical or upright standing position when not in use.

It will be appreciated that other computer modules or units can be included in the system 20. For example, a copying module or unit may be included in the system. It will also be appreciated that the modules or units described above may be configured in

separate modules or units and arranged in a single enclosure according to their general functionalities in a system.

The described portable personal computer system **20** allows a user to efficiently access a variety of computer components while minimizing the desk space and set-up time needed for operation, and maximizing the user's ability to transport the system. The present invention is described in terms of an exemplary embodiment. However, one of ordinary skill in the art would recognize that the principles involved in the present invention can be easily implemented in various configuration designs, and that any such variation would be within the scope of the present invention.